Section 4.14
Floodplains

This section discusses floodplains in the study area. In addition, the section provides information about the Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRM) for Davis and Salt Lake Counties that have been updated since the publication of the Final EIS.

4.14.1 Approach and Methodology

4.14.1.1 Changes since June 2000 Final EIS

To update the affected environment and environmental consequences information associated with floodplains in the study area, Sections 3.14 and 4.14 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. The study area for floodplains is described in Section 4.0.1, *Study Area*, of this document.

Utah State Floodplain Manager, Judy Watanabe, was consulted on September 18, 2003, to determine whether Davis County floodplain maps had been changed or revised since publication of the Final EIS (Watanabe pers. comm.). Nancy Barr of the State Floodplain Office was consulted on November 5, 2003, to determine whether Salt Lake County floodplain maps had been changed or revised since publication of the Final EIS (Barr pers. comm.). Scott Stoddard of the Corps was also contacted to determine whether the Corps floodplain study had been changed or revised since publication of the Final EIS (Stoddard pers. comm.).

4.14.1.2 Changes since Draft Supplemental EIS

Several changes have been made to the calculations of impacts on floodplains since the Draft Supplemental EIS was published in December 2004. As stated in Section 4.0, *Introduction*, additional minor modifications have been made to the alignments of Alternatives A and E (Final EIS Preferred Alternative) since preparation of the Draft Supplemental EIS. Impact information presented in Table 4.14-1 has been updated to reflect those modifications.

4.14.2 Affected Environment

This affected environment section presents a summary of updated information on the affected environment relative to floodplains. As indicated in the Final EIS, 15 communities in Davis County and 13 communities in Salt Lake County participate in the National Flood Insurance Program (NFIP), which is administered by FEMA. As stated in the Final EIS, the communities that participate in the NFIP are required to administer a permit review program that minimizes flood damages based in part on FEMA-

generated FIRM maps. The updated regulatory setting and updated status of the FIRM maps that pertain to the study area are presented below.

4.14.2.1 Regulatory Setting

Executive Order 11988, Floodplain Management, and Title 23 CFR Section 650, Subpart A, "Location and Hydraulic Design of Encroachments on Floodplains," provide guidance to federal agencies on constructing projects within the boundaries of designated floodplains.

Executive Order 11988, Floodplain Management

Executive Order 11988 requires that all federal agencies take action to reduce the risk of flood loss, restore and preserve the natural and beneficial values served by floodplains, and minimize the impact of floods on human safety, health, and welfare. Federal agencies' actions must reflect consideration of alternatives to avoid adverse impacts in floodplains, and must modify the proposed action to minimize such impacts where such impacts are unavoidable.

Title 23 Code of Federal Regulations Section 650, Subpart A, "Location and Hydraulic Design of Encroachments on Floodplains"

Title 23 CFR 650, Subpart A, prescribes FHWA's policies and procedures for locating and designing highway encroachments in floodplains. Specifically, FHWA must avoid longitudinal and/or significant encroachments into floodplains, where practicable, and must minimize adverse affects on floodplains resulting from its actions. 23 CFR 650.105(q) defines a "significant encroachment" as a highway encroachment and any direct support of floodplain development that would involve one or more of the following construction- or flood-related impacts.

- A significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route.
- A significant risk attributable to the encroachment.
- A significant adverse impact on natural and beneficial floodplain values.

A proposed action that includes a significant encroachment cannot be approved unless FHWA finds that the proposed significant encroachment is the only practicable alternative.

4.14.2.2 FEMA Studies and Maps

The floodplain map for Farmington Creek and Great Salt Lake was revised in 2001 to reflect updated hydrologic and topographical information (Federal Emergency Management Agency 2001). This revision resulted in an eastward expansion of the Great Salt Lake FEMA floodplain boundary of 152 m to 305 m (500 ft to 1,000 ft) between approximately 1500 West and 100 North in the City of Farmington (Figure 4.14-1). This is the only change to the FIRM maps that was reported for floodplains in the study area.

4.14.2.3 Vertical Datum Differential

There has been no change to the vertical datum differential since publication of the Final EIS.

4.14.2.4 Corps Floodplain Study

The Corps floodplain study has not been revised since 1998, and the Corps floodplain boundary has not changed since publication of the Final EIS (Stoddard pers. comm.). Therefore, there is no additional discussion of the Corps floodplain study in this document. However, since the FEMA floodplain boundary has been updated since publication of the Final EIS (see Section 4.14.2.2), the relationship between the Corps Great Salt Lake floodplain boundary (defined in the Corps floodplain study) and the updated FEMA floodplain boundary has changed.

4.14.2.4 Wetland Hydrology

As stated in the Final EIS, the wetlands found in the study area are not extremely important for flood control and/or water storage functions around river and stream systems. Their elevations are not high enough to perform those functions, and they are not geomorphically positioned in the watershed to capture and retain peak floodwaters of rivers and stream. Wetlands adjacent to Great Salt Lake provide more of a flood control function by capturing and storing a small portion of the lake's floodwater, helping prevent it from intruding into adjacent cities and towns. The wetlands in the Jordan River floodplain and areas surrounding Farmington Bay near Centerville also provide flood control functions (Federal Highway Administration et al. 2000). This information has not changed since publication of the Final EIS. For more information on wetlands see Section 4.12.

4.14.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, portions of all the proposed build alternatives would encroach into the FEMA 100-year floodplain of Great Salt Lake and several streams in the study area. The environmental consequences and mitigation measures associated with encroachment into these floodplains are similar to those described in the Final EIS. Since publication of the Final EIS, however, UDOT has reduced the proposed right-of-way of the proposed build alternatives from 100 m to 95 m (328 ft to 312 ft) (see Chapter 3, *Alternatives*, of this Supplemental EIS). This reduction in right-of-way width would reduce the area that would be within the 100-year floodplain for each proposed build alternative (Table 4.14-1). The environmental consequences associated with encroachment of the proposed action into the 100-year floodplain and the proposed mitigation measures are summarized below.

4.14.3.1 Floodplain Management

Section 4.14.1 of the Final EIS states that all the proposed build alternatives would run alongside or near both the FEMA and Corps 100-year floodplain boundaries throughout the study area, except that the Alternative B alignment would fall approximately 1 km (0.6 mi) inside the FEMA floodplain boundary in the Farmington area, and alongside the Great Salt Lake floodplain boundary in the southern portion of the study area. The expansion of the FEMA floodplain boundary in the Farmington Area, discussed above in Section 4.14.2.2, would increase the distance Alternative B within the floodplain of Great Salt Lake by approximately 152 m to 305 m (500 ft to 1000 ft). Figure 4.14-1 shows the location of the revised FEMA floodplain boundaries relative to the proposed Alternative B alignment.

All the proposed build alternatives would still be designed to allow passage of 100-year flood flows at stream crossings and a 100-year floodwater elevation in Great Salt Lake, as described in the Final EIS.

Floodplain equalization culverts would be installed to allow water from high lake levels to pass through the parkway to areas east of the proposed highway (Figure 4.14-2). Pumping water from Great Salt Lake to maintain flood levels below a set elevation and to protect the proposed highway alignment would not be required and is not included as a component of the proposed action.

4.14.3.2 Floodplain Impacts

The revision to the FEMA floodplain boundary does not change any of the overall impact conclusions presented in Section 4.14.2 of the Final EIS. The acreage of affected floodplain (both FEMA and Corps floodplains) associated with the proposed build alternatives is listed in Table 4.14-1. The table accounts for the reduced right-of-way.

Table 4.14-1 Impacts on Great Salt Lake Floodplain North of Center Street

Floodplain Area Associated with Build Alternatives	Area Affected by Alternative, Hectares (Acres)				
	Alternative A[1]	Alternative B[1]	Alternative C[1]	Alternative D[2]	Alternative E[1]
FEMA Floodplain Filled	12 (29)	82 (202)	15 (38)	17 (43)	17 (43)
Corps Floodplain Filled	56 (138)	150 (371)	131 (323)	86 (213)	81 (200)
FEMA Floodplain East of the Proposed Alignment	25 (62)	81 (201)	92 (227)	22 (56)	24 (59)
Corps Floodplain East of the Proposed Alignment	24 (60)	228 (562)	246 (607)	72 (179)	73 (181)

Notes:

[1] Area represents acreage of floodplain filled based on a 95-m (312-ft) right-of-way width. For Alternatives A, B, and C, this represents a reduction in the right-of-way presented in the Final EIS.

[2] Area represents acreage of floodplain filled based on a 100-m (328-ft) right-of-way. This right-of-way is consistent with that presented in the Final EIS.

No-Build Alternative

Existing Conditions (2004)

As stated in the Final EIS, no project-related impacts on floodplains would occur under the existing conditions No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. It is possible that these future projects would encroach into the FEMA and Corps floodplains, although the nature and timing of these projects are not known at this time. Floodplain

development permits, which would be issued by the governing local jurisdiction, would have to be obtained before construction within a floodplain could occur.

Build Alternatives

As described in Section 4.14.2 of the Final EIS, each build alternative would result in some longitudinal encroachment into the Corps and FEMA 100-year floodplain of Great Salt Lake, as well as transverse encroachments of the floodplains of several streams in the study area. These encroachments would be associated with construction of the proposed interchange with I-215 in the southern portion of the study area and construction of the proposed action alignments north of Center Street. Impacts on the Great Salt Lake floodplain that would occur as a result of the encroachment into the floodplain north of Center Street are quantified in Table 4.14-1. Impacts associated with construction of the interchange with I-215 are not represented in Table 4.14-1 because they would be the same under all build alternatives.

The acreages presented in Table 4.14-1 are based on a 95-m (312-ft) right-of-way width, except for the acreage presented for Alternative D, which is based on a 100-m (328-ft) right-of-way. Expansion of the floodplain boundary did not substantively change the acreage calculations presented in the Final EIS.

The location and design of all the proposed build alternatives avoids and minimizes, to the extent practicable, longitudinal encroachments into floodplains in the study area. None of the build alternatives would result in a significant encroachment into floodplains in the study area. Floodplain equalization culverts and stream crossing culverts would be included in the design to ensure that, during a flood period, evacuation and emergency vehicle routes would be maintained and that the natural floodplain values of the study area would not be lost. As a result, implementation of any proposed build alternative would meet the requirements of both Executive Order 11998 and 23 CFR 650, Subpart A.

4.14.3.3 Hydrologic Function of Wetlands

The hydrologic function of wetlands in the study area, or their ability to provide surface water storage, was evaluated in the Final EIS and reassessed in this Supplemental EIS using a hydrogeomorphic (HGM) model. All the build alternatives would directly and indirectly affect the hydrologic function of wetlands, as described in Section 4.12, *Wetlands*, of this document. The expansion of the floodplain boundary would not change this impact conclusion for any build alternative.

4.14.3.4 Mitigation Measures

As indicated in the Final EIS, to mitigate impacts on floodplains in the study area resulting from construction of any build alternative, floodplain equalization culverts would be installed to allow floodwaters to flow freely between the eastern and western sides of the proposed highway within the Corps floodplain boundary (Parker pers. comm.). Stream-crossing culverts would be designed to allow passage of floodwaters from the FEMA 100-year flood, and riprap would be provided at the ends of such culverts to minimize erosion. Providing equalization culverts to maintain hydrologic connection would minimize the impact on the hydrological function of wetlands on the east side of the alternatives. Both the floodplain equalization and stream crossing culverts are depicted in Figure 4.14-2.